Barcelona Supercomputing Center
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EXCELENCIA SEVERO OCHOA

The Added Value of User-Driven Climate Predictions

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EUCP
European Climate Prediction system

ICREA

In all sectors there are potential applications of climate predictions, but in some sectors the decision making processes that would benefit from decadal predictions, understood as a mature climate prediction tool, are better defined.

High

Agriculture	**Forestry**
Energy	**Fire management**
Water management	**Health**
Insurance	**Fisheries**
Transport	**Tourism**

Low

This is valid provided the added value of predictions-projections is illustrated to the users.

From project deliverables of EUCP (D 6.4), PRIMAVERA (D11.6) and EUPORIAS (D12.3). Additional sectoral comments in user engagement by S2S4E, APPLICATE, MED-GOLD, HIATUS and VISCA.

Seasonal-mean air temperature change for the RCP4.5 scenario over 2016-2035 (wrt 1986-2005). Stippling for significant changes, hatching for non-significant.

Δ Temperature - DJF

Temperature - JJA

(°C)
-1 -0.75 -0.5 -0.25 0 0.25 0.5 0.75 1 1.5 2 2.5 3.5 4.5 5.5

Can the users get anything better?
Can the users get additional time granularity?

IPCC AR5 WGI (2013)

Progression from initial-value problems with weather forecasting at one end and multi-decadal to century projections as a forced boundary-condition problem at the other, with climate prediction (sub-seasonal, seasonal and decadal) in the middle. Prediction involves initialization and systematic comparison with a simultaneous reference.

Subseasonal to seasonal forecasts (2 weeks-18 months)

Decadal forecasts (18 months-30 years)

Climate-change projections

Weather forecasts

Time

Initial-value driven

Boundary-condition driven

The big challenge is to provide climate information for the next 30 years from the best climate data sources

Adapted from Meehl et al. (2009)

CRITICAL ENERGY INFRASTRUCTURES IN GERMANY

KEY MESSAGES

Stakeholders...

Have a low awareness of existing climate services

Have a positive perception of risks and low risk awareness

Have a huge demand for seasonal and decadal predictions

— RECOMMENDATIONS —

Raise awareness on the availability of climate services

Set up a 'Climate Services Provider Store' to inform key actors on climate service providers for their case-specific needs

Increased funding and research on the field of decadal climate research

Mainstream cooperation between energy networks and climate services providers

Multi-model correlation between the predicted ensemble mean and reference (from GHCN and GPCC) standardised precipitation evapotranspiration index of the previous six months (SPEI6) for the boreal summer averaged over forecast years 2 to 5.
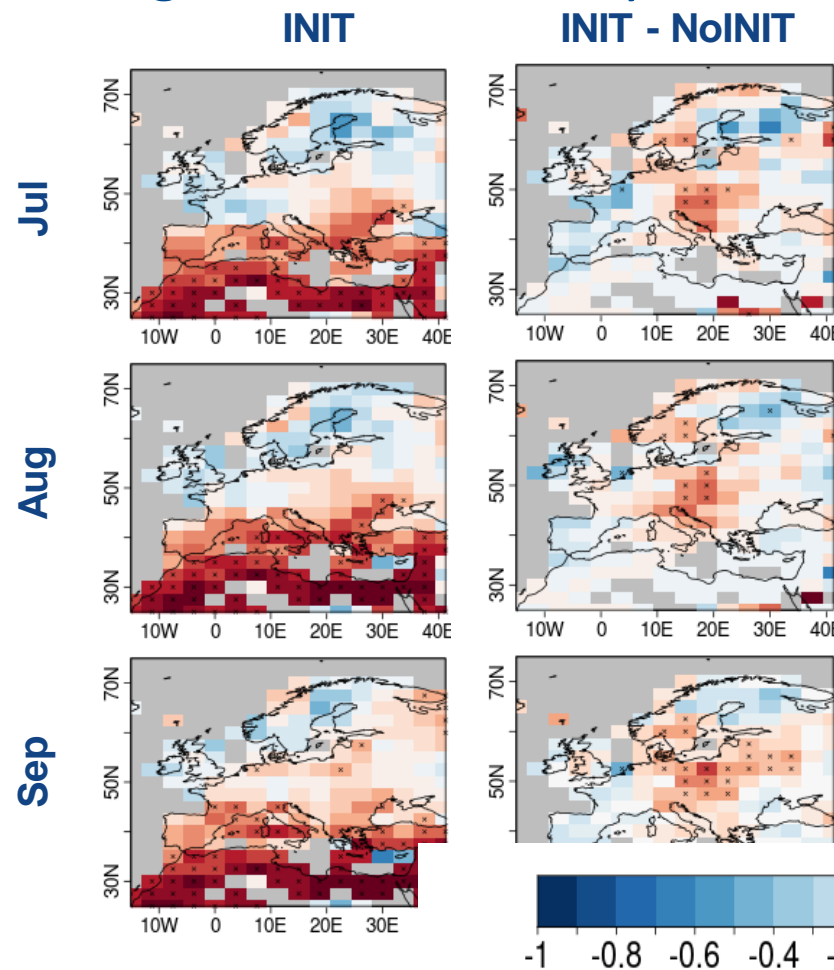
INIT: Initialized decadal prediction
NoINIT: Non initialized climate projection

Solaraju Murali (BSC)
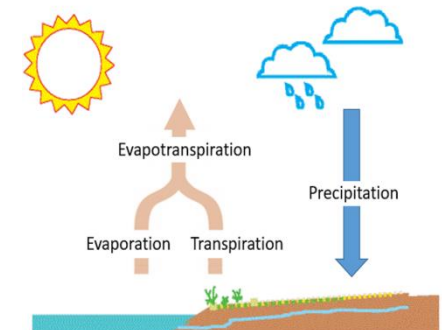
The multi-model real-time decadal prediction exchange is a research exercise that guarantees equal ownership to the contributors.

BSC is one of the four centres recognised as global producers of decadal climate predictions by WMO-CCl.

Multi-model decadal forecast exchange

The Met Office coordinates an informal exchange of near-real time decadal predictions. Many institutions around the world are developing decadal prediction capability and this informal exchange is intended to facilitate research and collaboration on the topic.

The contributing prediction systems ⎘ are a mixture of dynamical and statistical methods. The prediction from each institute is shown below, alongside an average of all the models. When possible, observations for the period of the forecast are also shown. Currently three variables are included: surface air temperature, sea-level pressure and precipitation. These are shown as differences from the 1971-2000 baseline. More diagnostics, including ocean variables are planned for the future. Please use the drop-down menus below to explore the data collected to date.

This work is supported by the European Commission SPECS project.

SPECS
Seasonal-to-decadal climate Prediction for the improvement of European Climate Services

To learn more about decadal forecasts at the Met Office, see our current decadal forecast.

Images last updated 2014-06-25

Issued	Period	Element
2013	year 1	surface air temperature

2017 predictions for 2018-2022 surface temperature

6

Lots yet to explore
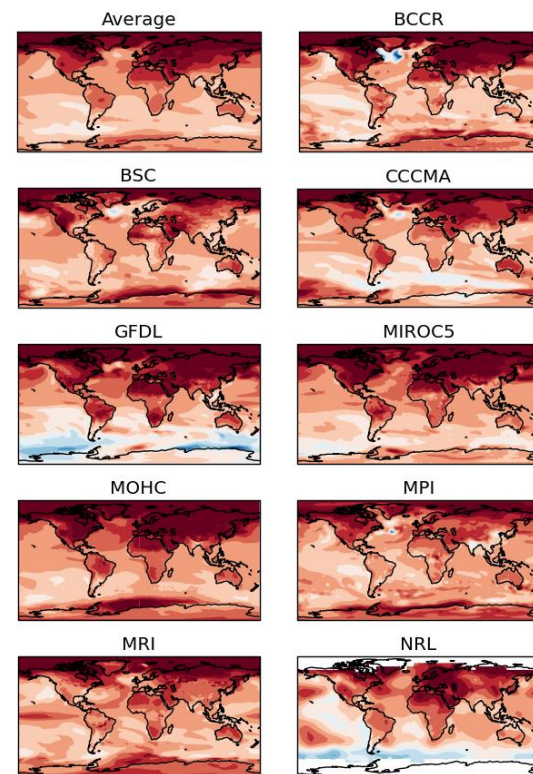
A non-exhaustive list of aspects to be explored in climate prediction:

- Definition of **benchmarks** from the user perspective (not just climatology, persistence or projections).

- **Standards and quality assurance**.

- Entry-level **documentation**.

- Integration of the **observational uncertainty** in the production chain.

- Model **weighting**, model **selection** and **prediction-projection merging**.

- Use of **new paradigms** like storylines and use of emergent constrains.